

Amendments

1. (Original) A bulk copy method, comprising operations of:
 - creating a copy-on-write relationship between specified source data and an original image cache for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache;
 - after completing the creating operation, utilizing an application outboard of the designated host application to copy all items of source data and their associated locations to a secondary data object without regard to whether the items of source data have been updated since creating the copy-on-write relationship;
 - copying a specified amount of contents of the original image cache to the secondary data object.
2. (Original) The method of claim 1,
 - where the specified amount comprises substantially all contents of the original image cache.
3. (Original) The method of claim 1, the operations further comprising:
 - between the utilizing and copying operations, terminating the copy-on-write relationship.

4. (Original) The method of claim 1, where:

the operations further comprise permitting the copy-on-write relationship to continue during the utilizing operation and during at least part of the copying operation;

the specified amount comprises contents of the original image cache as of completion of the utilizing operation.

5. (Original) The method of claim 1, where the copying operation comprises one of the following:

for each item of data being copied, copying the item of data from the original image cache to a location in the secondary data object corresponding to its associated location so as to overwrite any updated item of data of the same associated location and having been written by the utilizing operation;

appending the specified amount to contents of the secondary data object produced by the utilizing operation.

6. (Original) The method of claim 1, the operations further comprising RESTORE operations, comprising:

copying all items of data copied by the utilizing operation from the secondary data object to their respective associated locations in a restore site, then copying all data copied by the copying operation

from the secondary data object to the respective associated locations in the restore site overwriting any existing data in said associated locations.

7. (Original) The method of claim 1, where:

the copying operation comprises, if an item of data being copied corresponds to a location of an item of data already existing on the secondary data object, overwriting the existing item of data in the secondary data object;

the operations further comprising RESTORE operations comprising copying data items of the secondary data object to their associated locations in a restore site.

8. (Original) A signal-bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform bulk copy operations comprising:

creating a copy-on-write relationship between specified source data and an original image cache for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache;

after completing the creating operation, utilizing an application outboard of the designated host application to copy all items of source data and their associated locations to a secondary data object without regard to whether the items of source data have been updated since creating the copy-on-write relationship; copying a specified amount of contents of the original image cache to the secondary data object.

9. (Amended) The medium of claim 8,
where the specified amount comprises substantially all contents of the original image cache.
10. (Original) The medium of claim 9, the operations further comprising:
between the utilizing and copying operations, terminating the copy-on-write relationship.
11. (Original) The medium of claim 9, where:
the operations further comprise permitting the copy-on-write relationship to continue during the utilizing operation and during at least part of the copying operation;
the specified amount comprises contents of the original image cache as of completion of the utilizing operation.

12. (Original) The medium of claim 9, where the copying operation comprises one of the following:

for each item of data being copied, copying the item of data from the original image cache to a location in the secondary data object corresponding to its associated location so as to overwrite any updated item of data of the same associated location and having been written by the utilizing operation;

appending the specified amount to contents of the secondary data object produced by the utilizing operation.

13. (Original) The medium of claim 9, the operations further comprising RESTORE operations, comprising:

copying all items of data copied by the utilizing operation from the secondary data object to their respective associated locations in a restore site, then copying all data copied by the copying operation from the secondary data object to the respective associated locations in the restore site overwriting any existing data in said associated locations.

14. (Original) The medium of claim 9, where:

the copying operation comprises, if an item of data being copied corresponds to a location of an item of data already existing on the

secondary data object, overwriting the existing item of data in the secondary data object;

the operations further comprising RESTORE operations comprising copying data items of the secondary data object to their associated locations in a restore site.

15. (Original) A logic circuit of multiple interconnected electrically conductive elements configured to perform bulk copy operations comprising:

creating a copy-on-write relationship between specified source data and an original image cache for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache;

after completing the creating operation, utilizing an application outboard of the designated host application to copy all items of source data and their associated locations to a secondary data object without regard to whether the items of source data have been updated since creating the copy-on-write relationship;

copying a specified amount of contents of the original image cache to the secondary data object.

16. (Original) A data storage system, comprising:

a primary storage;

a secondary storage;

a computing machine;

an interface coupling the server to the primary and secondary storage;

wherein the computing machine is programmed to perform bulk copy operations including:

creating a copy-on-write relationship between specified source data in the primary storage and an original image cache for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache;

after completing the creating operation, utilizing an application outboard of the designated host application to copy all items of source data and their associated locations to a secondary data object without regard to whether the items of source data have been updated since creating the copy-on- write relationship;

copying a specified amount of the original image cache to the secondary data object.

17. (Original) A data storage system, comprising:

primary means for storing data;

secondary means for storing data;

original image cache means for storing data;

an interface coupled to the first and second means;

computing means, coupled to the interface, for performing bulk copy operations by:

creating a copy-on-write relationship between specified source data in the primary means and the original image cache means for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache means;

after completing the creating operation, utilizing an application outboard of the designated host application to copy all items of source data and their associated locations to a secondary data object in the second means without regard to whether the items of source data have been updated since creating the copy-on-write relationship;

copying a specified amount of the original image cache means to the secondary data object.